In the Claims

1. (Original) An optical node comprising:

a data interface operable to receive data for transmission to a plurality of destinations;

a buffer operable to store the data;

a transmitting unit operable to couple to an optical transmission medium having a plurality of data channels and to selectively transmit optical signals on the data channels; and

a controller operable to receive a token authorizing transmission on one of the data channels, to determine a transmission allocation, wherein the transmission allocation represents an amount of time that the authorized data channel may be utilized to transmit the data, to determine a destination allocation, wherein the destination allocation represents a proportion of the transmission allocation that may be utilized to transmit the data to a particular destination, and to transmit the data on the authorized data channel in accordance with the transmission allocation and the destination allocation.

2. (Original) The optical node of Claim 1, wherein the controller is further operable to receive a plurality of transmission control messages, each transmission control message including information identifying a node, a data channel, and transmission timing, to build a network schedule based on the information, to analyze the network schedule to determine an appropriate time period to transmit the data on the authorized data channel, and to transmit the data on the authorized data channel during the appropriate time period.

3. (Original) The optical node of Claim 1, wherein determining the transmission allocation and determining the destination allocation comprise analyzing topology information associated with an optical communication ring to calculate the transmission allocation and the destination allocation.

4. (Original) The optical node of Claim 3, wherein the topology information comprises a propagation delay associated with a segment of the optical communication ring and token-processing times and transmission-control-message processing times associated with a plurality of nodes on the optical communication ring.

5. (Original) The optical node of Claim 3, wherein the topology information is received by the controller when the optical communication ring is configured to modify communications equipment.

6. (Original) The optical node of Claim 1, wherein the buffer is further operable to store the data in a plurality of virtual queues, each virtual queue associated with a unique destination node, and wherein the controller is further operable to utilize a weighted round robin scheduler to determine which virtual queue to service.

7. (Original) The optical node of Claim 1, wherein the controller is further operable to generate a transmission control message identifying a destination node and the authorized data channel, to communicate the transmission control message to a next node, and to communicate the token to the next node.

8. (Original) An optical communication system comprising:

a plurality of optical communication nodes;

optical transmission media interconnecting the optical communication nodes, the optical transmission media having a plurality of data channels; and

a plurality of logical tokens corresponding to the data channels;

wherein each of the optical communication nodes is operable to:

receive data for transmission to a destination one of the optical communication nodes;

receive one of the logical tokens;

identify one of the data channels associated with the logical token;

determine a transmission allocation, wherein the transmission allocation represents the amount of time that the identified data channel may be utilized to transmit the data;

determine a destination allocation, wherein the destination allocation represents a proportion of the transmission allocation that may be utilized to transmit the data to a particular destination; and

transmit the data to the destination optical communication node using the identified data channel in accordance with the transmission allocation and the destination allocation.

9. (Original) The optical communication system of Claim 8, wherein each of the optical communication nodes is further operable to:

receive a plurality of transmission control messages, each transmission control message including information identifying an optical communication node, a data channel, and transmission timing;

build a network schedule based on the information;

analyze the network schedule to determine an appropriate time period to transmit the data on the identified data channel; and

transmit the data on the identified data channel during the appropriate time period.

10. (Original) The optical communication system of Claim 8, wherein determining the transmission allocation and determining the destination allocation comprise analyzing topology information associated with an optical communication ring to calculate the transmission allocation and the destination allocation.

11. (Original) The optical communication system of Claim 10, wherein the topology information comprises a propagation delay associated with a segment of the optical communication ring and token-processing times and transmission-control-message processing times associated with a plurality of nodes on the optical communication ring.

12. (Original) The optical communication system of Claim 10, wherein each of the optical communication nodes is further operable to receive the topology information when the optical communication ring is configured to modify communications equipment.

13. (Original) The optical communication system of Claim 8, wherein each of the optical communication nodes is further operable to store the data in a plurality of virtual queues, each virtual queue associated with a unique destination node, and utilize a weighted round robin scheduler to determine which virtual queue to service.

14. (Original) The optical communication system of Claim 8, wherein each of the optical communication nodes is further operable to generate a transmission control message identifying a destination node and the identified data channel, to communicate the transmission control message to a next node, and to communicate the token to the next node.

15. (Original) A method for token-controlled data transmission comprising:

receiving data for transmission to a plurality of destinations;

storing the data in a buffer;

coupling to an optical transmission medium having a plurality of data channels;

receiving a token authorizing transmission on one of the data channels;

determining a transmission allocation, wherein the transmission allocation represents an amount of time that the authorized data channel may be utilized to transmit the data;

determining a destination allocation, wherein the destination allocation represents a proportion of the transmission allocation that may be utilized to transmit the data to a particular destination; and

transmitting the data on the authorized data channel in accordance with the transmission allocation and the destination allocation.

16. (Original) The method of Claim 15, further comprising:

receiving a plurality of transmission control messages, each transmission control message including information identifying a node, a data channel, and transmission timing;

building a network schedule based on the information;

analyzing the network schedule to determine an appropriate time period to transmit the data on the authorized data channel; and

transmitting the data on the authorized data channel during the appropriate time period.

17. (Original) The method of Claim 15, wherein determining the transmission allocation and determining the destination allocation comprise analyzing topology information associated with an optical communication ring to calculate the transmission allocation and the destination allocation.

18. (Original) The method of Claim 17, wherein the topology information comprises a propagation delay associated with a segment of the optical communication ring and token-processing times and transmission-control-message processing times associated with a plurality of nodes on the optical communication ring.

19. (Original) The method of Claim 17, wherein the topology information is received by an optical node in the optical communication ring when the optical communication ring is configured to modify communications equipment.

20. (Original) The method of Claim 15, further comprising storing the data in a plurality of virtual queues in the buffer, each virtual queue associated with a unique destination node, and determining which virtual queue to service using a weighted round robin scheduler.

21. (Original) The method of Claim 15, further comprising:

generating a transmission control message identifying a destination node and the authorized data channel;

communicating the transmission control message to a next node; and

communicating the token to the next node.

22. (Original) Logic for token-controlled data transmission, the logic encoded in media and operable when executed to:

receive data for transmission to a plurality of destinations;

store the data in a buffer;

couple to an optical transmission medium having a plurality of data channels;

receive a token authorizing transmission on one of the data channels;

determine a transmission allocation, wherein the transmission allocation represents an amount of time that the authorized data channel may be utilized to transmit the data;

determine a destination allocation, wherein the destination allocation represents a proportion of the transmission allocation that may be utilized to transmit the data to a particular destination; and

transmit the data on the authorized data channel in accordance with the transmission allocation and the destination allocation.

23. (Original) The logic of Claim 22, further operable when executed to:

receive a plurality of transmission control messages, each transmission control message including information identifying a node, a data channel, and transmission timing;

build a network schedule based on the information;

analyze the network schedule to determine an appropriate time period to transmit the data on the authorized data channel; and

transmit the data on the authorized data channel during the appropriate time period.

24. (Original) The logic of Claim 22, wherein determining the transmission allocation and determining the destination allocation comprise analyzing topology information associated with an optical communication ring to calculate the transmission allocation and the destination allocation.

25. (Original) The logic of Claim 24, wherein the topology information comprises a propagation delay associated with a segment of the optical communication ring and token-processing times and transmission-control-message processing times associated with a plurality of nodes on the optical communication ring.

26. (Original) The logic of Claim 24, wherein the topology information is received by an optical node in the optical communication ring when the optical communication ring is configured to modify communications equipment.

27. (Original) The logic of Claim 22, further operable when executed to store the data in a plurality of virtual queues in the buffer, each virtual queue associated with a unique destination node, and determine which virtual queue to service using a weighted round robin scheduler.

28. (Original) The logic of Claim 22, further operable when executed to:

generate a transmission control message identifying a destination node and the authorized data channel;

communicate the transmission control message to a next node; and

communicate the token to the next node.

29. (Original) An optical node comprising:

means for receiving data for transmission to a plurality of destinations;

means for storing the data in a buffer;

means for coupling to an optical transmission medium having a plurality of data channels;

means for receiving a token authorizing transmission on one of the data channels;

means for determining a transmission allocation, wherein the transmission allocation represents an amount of time that the authorized data channel may be utilized to transmit the data;

means for determining a destination allocation, wherein the destination allocation represents a proportion of the transmission allocation that may be utilized to transmit the data to a particular destination; and

means for transmitting the data on the authorized data channel in accordance with the transmission allocation and the destination allocation.

30. (Original) The optical node of Claim 29, further comprising:

means for receiving a plurality of transmission control messages, each transmission control message including information identifying a node, a data channel, and transmission timing;

means for building a network schedule based on the information;

means for analyzing the network schedule to determine an appropriate time period to transmit the data on the authorized data channel; and

means for transmitting the data on the authorized data channel during the appropriate time period.

31. (Original) A method for token-controlled data transmission on an optical communication ring comprising:

receiving data for transmission to a plurality of destinations;

storing the data in a plurality of virtual queues in a buffer, each virtual queue associated with a unique destination node;

coupling to an optical transmission medium having a plurality of data channels;

receiving topology information when the optical communication ring is configured to modify communications equipment, the topology information comprising a propagation delay associated with a segment of the optical communication ring and token-processing times and transmission-control-message processing times associated with a plurality of nodes on the optical communication ring;

analyzing the topology information to calculate a transmission allocation, wherein the transmission allocation represents an amount of time that the authorized data channel may be utilized to transmit the data;

analyzing the topology information to calculate a destination allocation, wherein the destination allocation represents a proportion of the transmission allocation that may be utilized to transmit the data to a particular destination;

receiving a plurality of transmission control messages, each transmission control message including information identifying a node, a data channel, and transmission timing;

building a network schedule based on the information;

receiving a token authorizing transmission on one of the data channels;

analyzing the network schedule to determine an appropriate time period to transmit the data on the authorized data channel;

determining which virtual queue to service using a weighted round robin scheduler;

generating a transmission control message identifying a destination node and the authorized data channel;

communicating the transmission control message to a next node;

transmitting data from the selected virtual queue on the authorized data channel to the destination node in accordance with the transmission allocation and the destination allocation and during the appropriate time period; and

communicating the token to the next node.